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Electrochemical behavior of Diosmin and its sensitive determination on
ZrO₂-NPs-coated poly(diallyldimethylammonium chloride)-functionalized graphene
modified electrode

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Abstract

A new nanocomposite, zirconium dioxide nanoparticles decorated poly(diallyldimethylammonium chloride)-functionalized graphene (ZrO₂-PDDA-Gr), was successfully synthesized through a simple and green method. The simultaneous reduction of grapheme oxide (GO) and formation of ZrO₂ to produce the ZrO₂-PDDA-Gr had been achieved under hydrothermal conditions. The ZrO₂-PDDA-Gr showed excellent conductivity and strong adsorption ability toward Diosmin and thus was used to be an excellent probe for electrochemical sensing. The electrochemical characteristics of Diosmin were studied in detail and some dynamics parameters of electrode process were also calculated to discuss the reaction mechanism. Under the optimized conditions, a lower detection limit of 2×10^{-9} mol L⁻¹ (S/N=3) and a wide linear detection range from 5×10^{-9} to 2×10^{-6} mol L⁻¹ were achieved by differential pulse voltammetry (DPV). Additionally, the proposed electroanalytical methodology was applied in fresh lemon leaves and tablets with satisfactory results, showing that fabricated sensor has potential in application.

Keywords: Diosmin; Graphene; ZrO₂ NPs; Poly(diallyldimethylammonium chloride); Voltammetric sensor

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